

WHAT IS CLAIMED IS:

1. A force-applying input device comprising:
  - an operation unit operated by an operator;
  - 5 an encoder for detecting an operation state of the operation unit;
  - a torque generating unit for applying a force to the operation unit; and
  - a controller for controlling a driving operation of the
  - 10 torque generating unit in order to apply a predetermined force corresponding to the operation state of the operation unit to the operation unit, wherein
  - the controller comprises a first rotational angular speed calculating unit, a second rotational angular speed
  - 15 calculating unit, a rotational angular speed selecting unit, a rotational angle calculating unit, and a torque calculating unit,
  - the first rotational angular speed calculating unit calculates rotational angular speed information of the
  - 20 operation unit based on a signal pulse output from the encoder,
  - the second rotational angular speed calculating unit calculates rotational angular speed information of the operation unit based on rotational angular acceleration which
  - 25 the operation unit undergoes,
  - the rotational angular speed selecting unit selects either the rotational angular speed information output from the first rotational angular speed calculating unit or the

rotational angular speed information output from the second rotational angular speed calculating unit, the rotational angular speed information output from the second rotational angular speed calculating unit being selected and being

5 output to the rotational angle calculating unit and the torque calculating unit when the rotational angular speed information output from the first rotational angular speed calculating unit is greater than a predetermined value,

the rotational angle calculating unit calculates  
10 rotational angle information of the operation unit based on the rotational angular speed information output from the rotational angular speed selecting unit, and

the torque calculating unit calculates information of torque to be applied to the torque generating unit, based on  
15 the rotational angular speed information output from the rotational angular speed selecting unit and the rotational angle information output from the rotational angle calculating unit.

20 2. A force-applying input device according to Claim 1, wherein the controller further comprises a rotational angular acceleration calculating unit for calculating rotational angular acceleration information of the operation unit based on inertial moment of the operation unit and the torque  
25 information to be output to the torque generating unit from the torque calculating unit, and the second rotational angular speed calculating unit calculates the rotational angular speed information of the operation unit based on the

rotational angular acceleration information output from the rotational angular acceleration calculating unit.

3. A force-applying input device according to Claim 1,  
5 wherein the second rotational angular speed calculating unit stores maximum torque of the torque generating unit and inertial moment of the operation unit, and calculates the rotational angular speed information of the operation unit based on the maximum torque and the inertial moment.